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ABSTRACT

Designed to aid educational institutions and community organizations in selecting, planning, developing and using outdoor learning areas as outdoor classrooms, this guide includes: (1) Learning by Discovery (scientific, cultural, and recreational goals); (2) The Initial Planning Effort (use of: a planning committee including teachers, administrators, local leaders, and students; a technical advisory committee; soils maps; natural resource inventories; reference books); (3) Site Selection (examples of sites with: school proximity; soil diversity; water; specific vegetation; etc.); (4) Soils Mapping and Resource Inventory (development of: maps with photographic enlargements; site visits; an agronomic and town/country planning balance; area inventories such as cutover woodland, wet, white pine and pond, brook, and woodland areas); (5) Planning the Outdoor Classroom (facilities and special study points such as: soil erosion; weather stations; pioneer living; observation platforms; orientation courses; soil profiles; water wells; tree stumps; trails; etc.); (6) Site Development (financing, student construction, committees, etc.); (7) Using and Maintaining an Outdoor Classroom (suggestions re: biology, chemistry, math, arts, shop, home economics, social studies, vocational agriculture, ecology, communication, and English); (8) Bibliography (24 annotated citations and two films). (JC)

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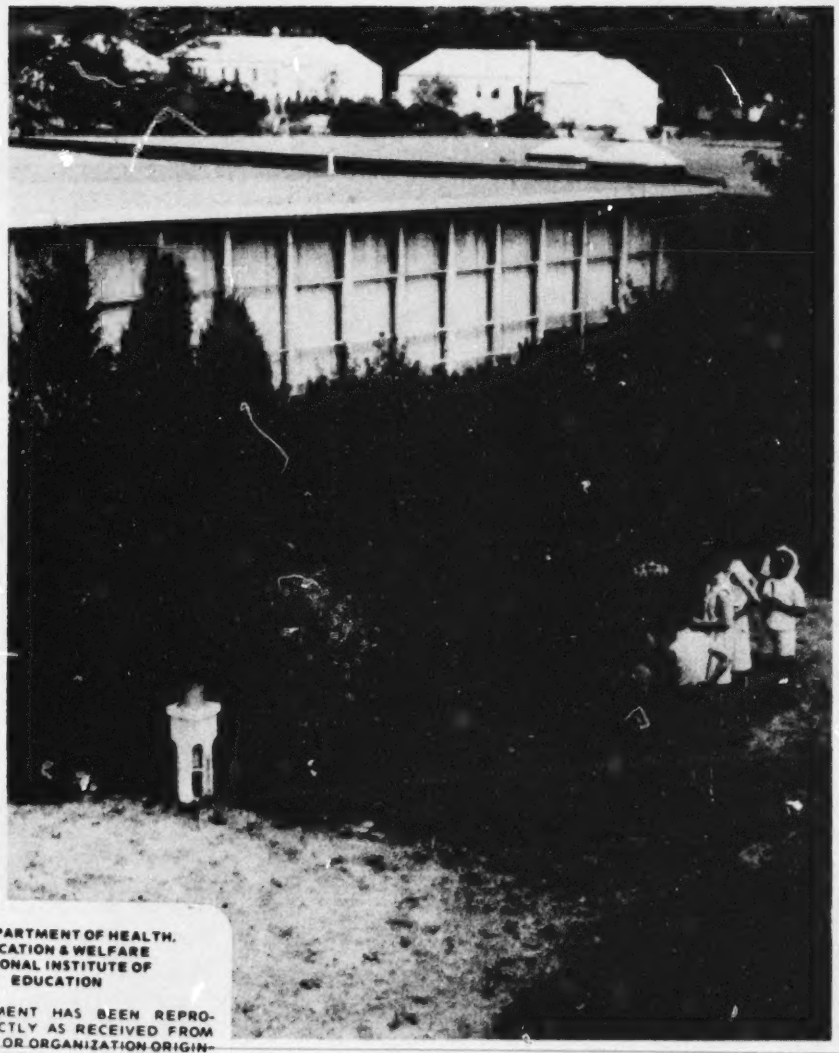

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AN OUTDOOR CLASSROOM

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U.S. DEPARTMENT OF AGRICULTURE • SOIL CONSERVATION SERVICE
UPPER DARBY, PA. • APRIL 1975

RC009497

THE SOIL CONSERVATION SERVICE of the U. S. Department of Agriculture provides assistance to all citizens concerned with the condition, proper use and development of the Nation's two billion acres of soil, water and related natural resources. Guided by boards of citizens governing 3,000 local Conservation Districts, SCS gives direct technical aid to every type of land ownership, including farms and ranches, rural residences and industries, parks and refuges, recreation areas, water supply and flood prevention sites.

PROFESSIONAL EDUCATORS increasingly seek Conservation District aid in shaping instructional programs for new generations sensitized to environmental needs. An outstanding measure of response has been the establishing of thousands of "outdoor learning areas" through the coordinated efforts of educators, their local Conservation District leaders, and resource technicians from SCS and other agencies. This booklet describes methods used to develop sites whereon students and the community-at-large may gain first-hand knowledge of the natural world and the means of protecting it.

Institutions and organizations interested in planning on-site conservation education facilities of this sort are welcome to contact their Conservation District headquarters and the resource agencies that furnish local assistance.

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Locate

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AN OUTDOOR CLASSROOM

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I. INTRODUCTION: LEARNING BY DISCOVERY

Learning by discovery adds a touch of lasting magic to first-hand knowledge. Seeing a living plant growing in its natural surroundings or watching a bird nesting is much more meaningful than learning the same lesson from a textbook. Thus, the logical place to learn about our natural environment is outdoors where living things can be observed in their natural condition. A city school yard or a large rural school property, thoughtfully designed to stimulate this learning process, can become an effective outdoor classroom.

Benefits of direct involvement with nature in outdoor classrooms are endless. Understanding the interrelationship of man with his environment becomes a living fact. Lab exercises and academic visuals are replaced by real plants, real birds, real soil and real water. Exciting curiosity replaces chalkboard learning. Textbooks come to life. Students, young or old, gain a greater appreciation, awareness and respect for their natural surroundings.

Human life, as with all living things, is dependent on the delicate balance of all natural resources. Conservation of these resources is the concern of everyone--city dweller, suburbanite or rural resident. The outdoor classroom provides an opportunity to develop basic knowledge necessary to understand our growing environmental problems.

Many goals can be attained in an outdoor classroom. They may be limited, or broad and variable, depending upon the individual area. The listing which follows is not complete nor is it easy to separate scientific goals from cultural or recreational goals. Most activities would result in accomplishments for all three goals.

1. Scientific Goals

Show the great diversity of life--plants and animals--on any given land, or land and water area.

Teach students to identify and know common plants and animals and their relationship to man.

Show the interrelationship of plants, animals, soil and water.

Teach awareness of the cyclical nature of living things and the close relationship of the cycles to weather (seasonal) variation.

2. Cultural Goals

Help students from both urban and rural areas learn, first-hand, how plants and animals develop.

Develop student esprit de corps through participation in outdoor projects--designing, planning and installing structures and trails; making and recording observations; determining factors that affect plant or animal behavior.

Help students become aware of the importance of natural resource conservation and basic techniques involved in environmental studies.

Help students become aware of man's dependence on plants and animals.

Teach students the rudiments of outdoor manners and conduct.

Develop an understanding and appreciation of beauty.

Help students enjoy nature and camping experiences.

Help urban people realize that:

--food comes from soil and water, not the supermarket.
--milk comes from cows grazing on lush pasture grass, not a refrigerator.
--lumber comes from forests, not a lumber yard.
--paper comes from trees, not a stationery store.

3. Recreation Goals

Provide for breaks in study routine which are in themselves enriching.

Provide areas where students may watch bird and other animal behavior as a recreational activity, apart from organized studies.

II. THE INITIAL PLANNING EFFORT

A planning committee should be formed. Considering the opportunities provided by a new outdoor classroom, its planning and development should reflect the thoughts and needs of the local community. When a school is involved, a suitable cross-section of teachers, administrators, local civic leaders and students should be represented.

Community interest will increase potential manpower and material sources. Science teachers need to play a leading role in planning an outdoor classroom. Other teachers should be included to assure broad curriculum involvement. A school administrator, PTA or home-school officer, student council president, conservation district supervisor, news media representative, local business and industry head, leaders of civic clubs, church and youth groups, garden and nature organizations including landscape architects, nursery and garden suppliers should be invited to participate in selecting, planning, and developing the outdoor classroom. Six to eight members should make an effective committee.

Community interest and participation is an important part of planning an outdoor classroom.

A technical advisory committee should also be formed to provide the expertise needed in locating, planning and developing the outdoor classroom. In addition to SCS technicians, members of state conservation departments, fish and wildlife division, Cooperative Extension Service and similar professional resource specialists can be helpful committee members.

Using soils maps, natural resource inventories and the conservation planning experience of these technical advisors will help insure maximum diversity and manifold uses for outdoor classrooms.

At the initial contact with the point of interest or request for assistance, you as the SCS representative, should strongly encourage the formation of these two committees.

Committee members should be encouraged to read many of the reference books listed in the attached bibliography. This will give them some idea of what is involved in planning a conservation classroom and help them decide what should be included in the area they will plan.

III. SELECTING A SITE

Almost any area might be developed into an outdoor classroom. The only limitations are the imagination of the planners, funds and a work force. For instance, a school courtyard may be ideal. If more than one site is available, there are some features which make some areas better than others.

Select a site that offers the most number of advantages.

Here are a few:

1. An area close to school has many advantages. Students, individually or in classes, can visit and enjoy it without the necessity of arranging special times and transportation. Protecting the area from vandalism is also much simpler if it is nearby.

2. Diversity is of prime importance. An area having both moist and dry soils will support a much greater diversity of plants and animals. It also offers more learning possibilities to students. By use of planting and irrigation, diversity can be introduced but some artificiality is inevitable.

3. Water is an important study element. Sites with a flowing stream should be given greatest consideration. Ponds and marshes can be constructed but streams cannot.

4. An array of soils that present a variety of problems in their proper use is an important feature. The presence of highly contrasting soils, well suited or unsuited for given use, would enhance the site for many study projects. Larger sites increase these situations. On small areas, soil monoliths rather than soil pits may be used.

5. The smaller the area is, the more restricted and intense its use. Maintenance problems also increase.

6. A minimum of natural and man-made hazards and distractions make easier development and use.

7. The presence of vegetation that includes trees, shrubs and herbaceous plants representing the natural environment is desirable. Indigenous (native) species are good indicators of an ecological balance and are very desirable in an outdoor classroom.

8. Areas that have been disturbed by removing all native vegetation may be difficult to revegetate. Where soils are altered, the selection of plants becomes more difficult depending on the degree of disturbance.

If more than one area is available, the general features listed above, plus the soils, vegetation and water on the site, should also be taken into consideration. A basic resource inventory is advisable on each area in order to properly determine which area has the most existing learning opportunities and alternatives for further development.

In many instances only one area may be available for development. If this is the case, the inventory and appraisal process should become part of the plan development phase.

IV. SOILS MAPPING AND RESOURCE INVENTORY

Make use of all available data in preparing soils information for a potential outdoor classroom. If the site under consideration is in a county having a published soil survey, make use of that information. If a published soil survey is not available, the site may be part of a property already having a conservation plan. If so, this information may be helpful.

If a soils map is available, it should be enlarged photographically for presentation and discussion purposes. Remember the enlarged scale only improves the visibility of the map, not the detail.

Visit the proposed site with a local SCS scientist and examine the soils. Have him sketch in those soil areas which could not be shown on the original map because of its scale.

If a soil map of the site is not available, ask the SCS soil scientist to prepare one. Consider having this map prepared on the enlarged aerial photograph rather than on one of standard scale.

In either situation, once a site has been selected for development, have the SCS soil scientist map the soils, in detail, on the enlarged aerial photograph. This map then would become one of the basic items used in the design of the site.

In selecting interpretations, remember that the site is to serve as an outdoor classroom. Regardless of whether the site is in a predominantly farming community or a predominantly urban community, strive for a balance between agronomic interpretations and those involved in town and country planning.

Interpretations on the suitability of the soils for wildlife habitat and the kinds of wildlife they attract should also be considered.

For town and country interpretations, present the data in terms of the limitations of the soils for such uses as on-site sewage disposal fields, homes with basements, homesite landscaping, shopping centers, streets and parking lots, athletic fields, sanitary land fills, campsites, picnic areas, parks, golf fairways, etc.

An inventory involves the identification and location of major plant species, vegetative communities, unique features and water in the area. The purpose is to get a clear understanding of the existing resource characteristics and opportunities so that an appraisal of suitability can be made and the best site selected. Potential areas should be walked over by the planning committee and technical advisors. The vegetative species and types should be recorded on a map. The total area could be broken up into smaller areas or fields for planning purposes later on. This could be done on the basis of the vegetative types or plant communities.

Here is an example of an inventory.

Area 1 - Cutover Woodland

This area is a stage of plant succession where the vegetation is primarily hardwood sprout growth. There are young fir trees scattered throughout the area. Some hardwood is in the sapling to pole stage. Part of the area is in pole to mature pine. Travel is difficult. Trails would have to be cut to make the area accessible to students.

In its present stage, it provides excellent habitat for rabbits, deer, and grouse plus numerous songbirds.

Area 2 - Wet Area

The area is primarily wet. The plant community is made up of mosses, sedges, cranberry, heaths, blueberries, and ribes (currant or gooseberry). It appears that a marsh could be constructed in this area.

The hedgerow along the side next to the road contains native shrubs, such as black alder (Ilex), witherod and arrowwood (viburnums), dogwoods (cornus), spruce, maple, apple, etc.

Area 3 - White Pine and Pond Area

A young stand of white pine could be used to demonstrate the effect of pruning and thinning. Spacing is six feet by ten feet. Native azaleas are also found here.

A small dugout pond is present. Water is satisfactory for fish (minnows).

Area 4 - Brook Area

A brook flows through this area containing some old pines and large hardwoods with typical stream-side vegetation. The brook flows most of the school year except possibly early fall. Pools are shallow and may go dry. No pollution is evident.

Area 5 - Woodland

This is a mixed woodland with fir the dominant tree species. Spruce and white pine are present as well as maples, ash and other hardwoods. The understory is primarily brambles in the old cutover areas, ferns and club mosses. There are cradle knolls or hummocks where trees fell in the past.

While making such resource inventories, jot down ideas about how the area could be used as an outdoor classroom. (See example in section V - PLANNING THE OUTDOOR CLASSROOM.) This process helps to identify potential alternatives and opportunities of each site for final selection.

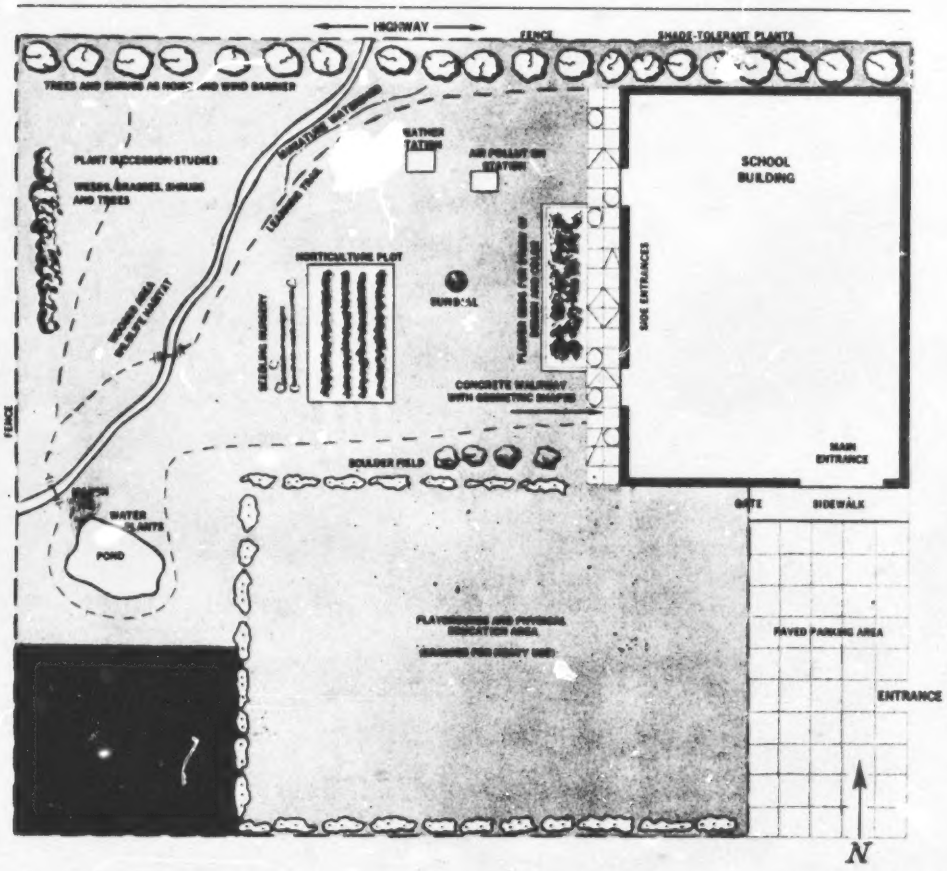
In many instances, needed vegetation may not be present. Most or all of it can be planted.

V. PLANNING THE OUTDOOR CLASSROOM

Once the outdoor classroom site is selected, assistance should be provided in developing a general layout and conservation plan. An enlarged aerial photo or overlay (Details in Chapter IV) is desirable for a pictorial plan or layout. This is useful in explaining the plan to all concerned and in obtaining final approval by school administrators.

For planning purposes, the area may be subdivided into vegetation types and plant communities as identified in the inventory. These areas may serve as locations for theme trails.

The practices needed for soil erosion control and land treatment should be discussed with committee members. This may include critical area planting, streambank protection, grassed waterways, tree planting, debris basins, diversions and grade stabilization structures. Some areas needing erosion control should remain untouched for educational purposes.



A typical suburban school outdoor classroom plan

Once a site decision is made, such items as facilities, trails, special study areas, and conservation demonstration points should be pinpointed on the map.

The educational needs, proposed program, cost of development, maintenance problems, aesthetic considerations, and available leadership are all factors to be considered by the committee in determining what items might be developed.

In planning land treatment, it is important to show good and bad treatment. For instance, do not improve the whole woodlot. Leave a natural area as it is so children and adults can see the before and after situations.

The conservation plan will record land use decisions. It will be helpful to write up seeding, lime and fertilizer rates as amount per 1000 sq. ft. etc. because most of the work will be on areas less than an acre.

The resource inventory information previously collected can be used to identify many opportunities and determine alternatives. Here are some examples of outdoor classroom facilities to consider:

Entrance Marker - Sign, map of area and regulations.

Toilet Facilities - Adequate facilities if not adjacent to school building.

Parking Area - Ample car and bus parking if not located near school parking facilities.

Small Museum and Laboratory - A sheltered facility to house experiments and interesting displays if area is not adjacent to school.

Elevated Walkway - A walk constructed on driven poles can carry observers over a marsh, mud flat, or water's edge. This permits extensive observation of the wet area by many people without any destruction of the habitat.

Benches - Located at special points for study, discussion or observation.

Drinking Water - Safe sources of water if not adjacent to school building.

Directional Signs - Located along trails.

Information Signs - These signs should be in keeping with the atmosphere of the area. Rustic signs are best. Signs should be informative, accurate and concise. Signs can relate one plant to another or a plant to an animal; to sunlight or shade. As a rule, scientific names and detailed facts have no interest for young children. It is more important for them to associate a common name with an outstanding characteristic. For example, a sign stating that this three leaf vine will make you itch will be remembered, while a sign saying that the scientific name of Poison Ivy is Rhus radicans will be forgotten by the time they get home. Some trails may be unmarked as a test for plant identification.

Safety Rails - Located at needed points along trails.

Information signs should be rustic in style.

The following are examples of special study points.

Identification of Grass, Shrubs and Trees - Study plants and trees that provide shade, prevent soil erosion, provide food and cover for wildlife, serve as windbreaks or mark the boundary of the property. They may act as a buffer zone to insure privacy against an adjacent populated area, demonstrate principles of plant growth, serve as a resource for ecological studies, and provide real practice in forest management These can be labeled with names and values.

Plant Grafting - A demonstration area which provides interesting studies in genetics such as production of flowers, fruits and seed.

Animals-baiting Area - Put a salt lick and some meat in a cleared area. Place loose dirt around the baited spot, spread it, press it down with the feet, and smooth it out. Animals attracted to the area will leave their footprints, which can be observed and studied.

You can also use small soft drink cans with ends cut open. Smoke index cards with a candle and place the cards in the cans. Add small pieces of bait (peanut butter and rolled oats). Small animals will leave tracks on the smoked cards.

Birdhouses will help attract more birds to the outdoor classroom.

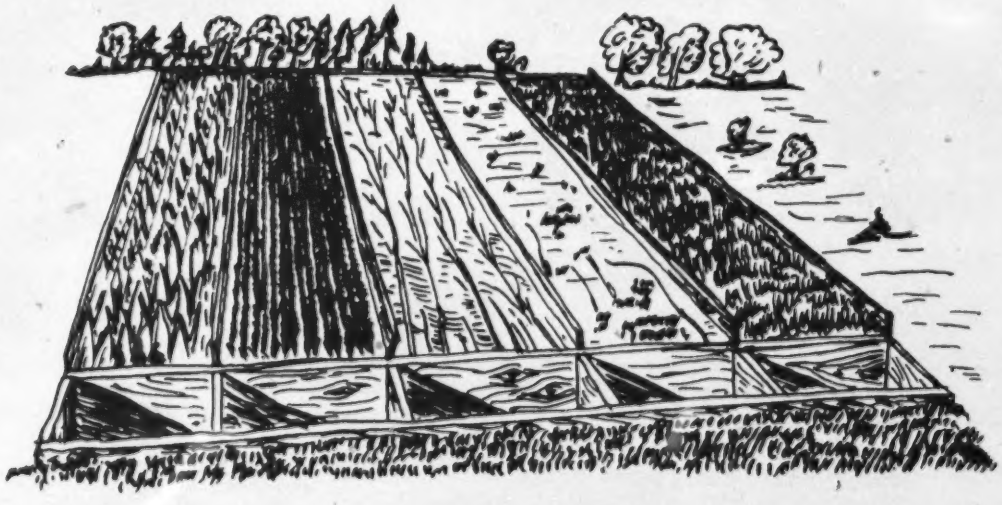
Provide mixed plantings and construct birdhouses, squirrel houses, feeders and birdbaths to attract a variety of birds. a nearby blind will provide an excellent lookout for observation and photographs.

Natural Succession Area - An area could be set aside in which no development would be made. It would be given complete protection and would provide a spot for the observation of ecological aspects.

Soil Erosion Demonstration Areas - This should be an area featuring good conservation practices, situated on an inclined area, and located next to a piece of land denuded of its vegetation and also located on an incline. Comparisons can then be made over a period of time to determine what happens to the quantity and quality of soil in both areas.

Demonstrations can include areas having (1) no cover; (2) grass; (3) strip crops; (4) diversion terraces. Use five feet by twenty feet areas framed with boards and on sloping ground for each type of cover or practice. Provide a means of catching runoff water from each, for case studies, during particular rainstorms.

Weather Station - This is for the study of meteorology and should be located in an open area that can be fenced off and locked.



A soil erosion demonstration shows the value of vegetation on the land.

Pioneer Living Area - Social studies can be nicely tied in with such an area. Dramatize the life of the pioneer, including such things as making dyes from plants, cooking outdoors, constructing shelters, learning to identify edible plants and learning other survival practices.

An observation platform can be used to observe and photograph wildlife.

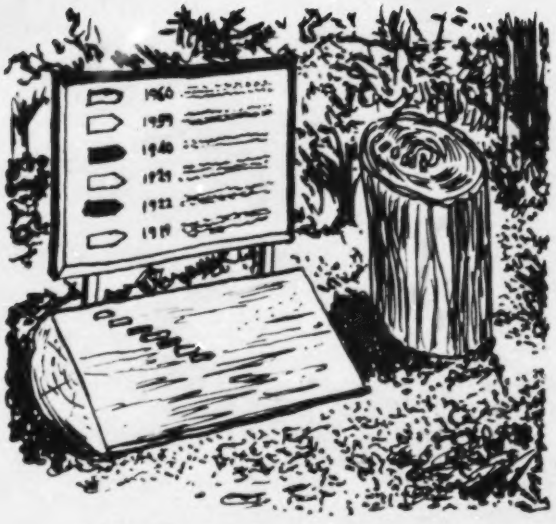
Observation Platform - This platform can be used for observing birds and for studying astronomy. It should be located on the highest point of the property. It is usually an elevated wooden or stone structure where individuals and groups can gain a clearer view of the area.

Orientation Courses - The development of several courses for map and compass use would stimulate education and recreational use of the area.

Soil Profile - A profile showing the different layers of soil can be demonstrated with a pit to be dug in cross-section fashion at the side of a bank.

Water Well - To study water table changes.

A soil profile can be a basic teaching tool.



A tree stump and a section of a log make a useful educational feature.

Tree Stump - A sloping cut on top of a tree stump could be smoothed and waterproofed. A section of a log could be planted if a suitable stump is not available. The annual rings of growth can show effects of competition in earlier years and benefits of woodland management in recent years. Historic events could be listed on an adjacent chart with dates and a time scale placed on the stump for matching. A split-section of a log can be placed nearby to show more about tree growth and how the grain of wood is caused by annual rings.

Plant Succession - This is a demonstration area showing the various stages of plant succession, starting with a clear-cut or denuded plot of ground going all the way to the higher stages of tree growth. The important stages to be shown are:

Stage 1 - Mixed Weedy - annual and perennial weeds and grasses.

Stage 2 - Perennial Grass - bluegrass, fescue, timothy.

Stage 3 - Shrubs - sumac, gray birch, sassafras, cherry and aspen.

Stage 4 - Coniferous Woodland - fir, hemlock, pine, and spruce.

Stage 5 - Hardwoods - oak, hickory, beech, ash and maple.

Christmas Tree Plantation - Plots can be planted to Scotch pine or similar trees for Christmas trees. These areas can be managed by students to teach them elements of pruning and tree farming.

Aquatic Plant Pond - A small pond can be dug out or constructed in a wet area and certain aquatic plants planted for special study. These include water lilies, cattails, pickerel weeds, arrow leaf, and rushes with liverworts and other water-

A small pond can be constructed in a wet area and used to demonstrate the value of aquatic life.

loving plants along the edges. This pool could be a part of the water's edge trail. Plastic liners may help waterproof a pond built on undesirable soils.

Overlooks - In hilly terrain natural observation points can be cleared or marked from which to view natural features, conservation practices and historial settings.

Many other items can also be planned such as insect study, animal study, fish study, or other items contained in school biology or science books.

Trails can be laid out for resource interpretation purposes; to connect special study areas; or a combination of features. Listed below are examples of trails. All or some items could just as well be on one trail winding through an area:

Brook Trail - Follows a stream to point out such things as the action of water as a soil builder, the power of water in soil erosion, and importance of the surrounding watershed. It illustrates several types of habitats for plants and animals and leads past such water features as riffles, slack water and pools.

Water's Edge Trail - Follows along the edge of a large pond, lake, or river and points out the vegetative transition between land and water. In the case of the small pond, the trail could go around the body of water and over it by means of a raised walkway or bridge which would permit observation without destruction of the habitat.

Woods Trail - Shows the natural steps in plant succession, particularly from an open area to climax forest. It also goes through forest types which exhibit certain characteristics of sun and shade-tolerant trees such as hemlock, hickory and maple. Trail should lead through areas under forest management and past sites that explain the importance of forest protection, fire prevention, and the effects of shade, humidity and temperature on forest growth.

Soil Trail - This trail is chiefly designed to illustrate the various factors in the formation of soil. It also shows the effects of thawing, freezing and weathering on soil. It shows how lichens, mosses, ferns, grass, shrubs, trees, and animals affect the soil and are related to it.

Animal Shelter Trail - Shows homes, nests and dens of wild animals. During proper season, the trail leads past features which tell the story of hibernating animals.

Bog or Marsh Trail - A trail that takes the visitor alongside and through as well as over a marsh on a footbridge. Here the story of the relationship of land to water levels can be told and seen.

If marsh is not present, a wet area can be built. Dig down to water level and fill with sphagnum of peat moss and bog plants. If soil is not wet, it may be lined with plastic for waterproofing.

A wading pool set in the ground along a dry trail will soon be filled with aquatic plants and animals.

Many successful outdoor classrooms have developed booklets describing their trails. The booklets identify the various trees, shrubs and wild flowers found along each trail. Sometimes a number system is used to relate the trail sites to the booklet. Simple sketches can be used to help identify the plants.

VI. SITE DEVELOPMENT

With the outdoor classroom planned and approved by all concerned, the project is ready to take shape on the land. A school administrator makes an ideal chairman for this activity. Teachers can provide valuable assistance. The SCS District Conservationist and other resource agency people should be available as technical advisors.

If the area being developed is part of a new school building project, the architect should be consulted to assure coordination with his plans.

Leaders of local youth groups can provide help. Involvement of these youth groups will also mean added interest, use and pride in the outdoor area.

It would probably be desirable to form more than one working committee to get the various jobs done. If possible, a member of the planning committee should head up each working committee. Each chairman could then select committee members from interested local people and school personnel.

A finance and budget committee should be chaired by a school administrator. A local businessman, industry representative, banker, PTA office and a student council representative would be desirable members. It would be the job of this group to estimate the cost of development of the site and arrange for money needed in situations where school budgets are limited. The facilities included in the plan should be specified and local cost estimates obtained. This committee could also prepare a schedule of operations on a yearly basis and figure money needs accordingly. The committee should also be responsible for any fund-raising effort if local financing is necessary. The technical committee can be helpful in estimating these development costs.

A labor and materials committee should prepare a list of the various types of materials and labor that will be needed in developing the area. Items such as shovels, axes, hatchets, measuring tape, twine, saws, hammers, nails, wheelbarrows and a few truckloads of woodchips add considerable cost to the project, if purchased.

The committee may want to attempt to obtain much of this material and labor free from local sources. A news media representative or public relations man might help promote this public-spirited movement. More expensive material and equipment could be borrowed or rented and difficult jobs contracted.

Depending on circumstances, teachers could be hired to work on the project in their spare time. In this case, their salaries may need to be considered in overall costs of the project. Local fund-raising efforts may cover this. Grants may also be available from state education departments.

Student labor used in developing the area is a big asset. This creates more personal interest in the project among the students and adds some degree of protection to the area.

Students should help in developing an outdoor classroom.

High school students from low-income families can be hired during summer months. Money for this assistance can be obtained through the Federal Elementary-Secondary Education Act, Title I. Details on this can be furnished by State Educational Departments of HEW, Office of Education, Washington, D. C. The new Environmental Education Act (P.L. 91-516) also makes financing available for development of conservation education projects. (See bibliography reference #19 for information about a handbook on this source of assistance.)

By developing the area in stages rather than in a few months, help can come from elementary and secondary students using the area. For instance, instead of planting trees or shrubs in an entire area designated for this conservation measure, it could be planted in sections on an annual basis. This offers an excellent conservation lesson to the students as they watch their plants grow from year to year.

Construction work in a new outdoor classroom starts with the job of locating and staking out the study points, trails and other facilities. Identifying native plant materials in the area, selecting new plants and making related technical decisions should be handled by technically-oriented members of the labor and materials committee. Here science teachers can play an important role. The SCS District Conservationist and other resource agency people should act as advisors to the committee. A local nature study expert such as an active Audubon Society member would also be a helpful addition to the group.

Active participation in planting trees and shrubs by students increases learning interest.

Everyone should understand the importance of leaving natural vegetation undisturbed when it is not directly on a new trail or at an observation point. This vegetation is a valuable asset that can't be replaced. The approved work plan should be the basic guide for locating the trails, study points and other facilities. When laying out a trail in an outdoor classroom, first stake out the route as indicated in the plan. Stretch plastic tape or white string from stake to stake as a guide. Be sure no unexpected obstacles (large tree, boulder, poorly drained area, etc.) are in the path of the new trail. Check on possible detour around the obstacle rather than removing it. Paint can be used to mark small trees, branches and shrubs to be removed from the trail line. Axe blazes should be limited to trees that are certain to be removed.

Trails should be made wider at the starting point to provide room for groups who will gather at this point. Narrow the trail down to single-file width as it leaves the starting area. Usually two to three feet is ample. Overhead branches lower than ten feet should be removed. Limbs will hang much lower when wet or laden with snow so the extra height is needed. Do not remove nearby dead trees or shrubs unless they are a safety hazard. They are part of the existing natural exhibit and can provide ideal nesting places for squirrels, raccoons and birds. When removing trees, cut the trunk flush to the ground. Use some accepted chemical to treat stumps to prevent future growth. Tree limbs should be cut close to main trunks to eliminate dangerous points. Cuts should be treated with tree-wound paint to assure healing.

Most useful tools for clearing are: power saw, axe, handsaw and pruning shears. Ideal time of year for clearing a new trail is fall or winter when foliage is at a minimum.

Avoid extensive trail grading as much as possible. Ten percent grades should be a maximum to prevent erosion. Also, remember older people will be using the trails. Steeper slopes should have steps built into the trail. Slabs of native stone, wood or hewn logs are ideal. Wood should be treated with a preservative chemical.

Logs cut to clear the trail can be used around stopping points and to mark turns. This will help keep visitors from trampling nearby plants. Too many log borders ruin the natural look of the area. They should be limited as much as possible.

Clay or boggy areas that tend to be wet and slippery should be topped with cinders or gravel. Barkchips or woodchips, two to three inches deep, make an ideal trail bed. Treated sawdust is also acceptable. Gravel can be used if other materials are not available.

Group study facilities within the area should be kept simple, rustic and functional. They should be located near the main trail yet far enough away so that groups using the area won't be disturbed by other trail users. A small amphitheater-type clearing on fairly level land is an ideal location. Treated logs formed in a semicircle can serve as seats. Railroad ties also make good seats.

In a more refined setup, split logs, properly hewn and sanded, can be nailed to log footings to provide added comfort. The school's manual training shop class might provide this woodwork service. Seating capacity should be capable of handling up to 30 to 50 students. In some instances, it may not be desirable to have seating arrangements. This would be dependent upon the study purpose.

VII. USING AND MAINTAINING AN OUTDOOR CLASSROOM

Outdoor classroom values will be obvious to science and social studies teachers. But a mathematics or domestic science teacher may ask, "What's in it for me?"

Having the answer to this question is the key to future teacher support and involvement. Its importance cannot be overemphasized.

Here are some examples of outdoor classwork activities listed by different subjects that are designed to involve students:

Biology - Planting trees or grass, studying flora and fauna, laying out a nature trail, studying samples of soil or water.

Chemistry - Testing soil, applying fertilizer, testing pond water for oxygen content, pH, etc.

Mathematics - Measurements of tree heights, of distance to objects; computations of irregular areas and shapes; contour mapping; and measuring slope and elevation.

Arts and Crafts - Landscaping; using natural materials for decorations; drawing or painting outdoor scenes; making leaf prints; and preparing flower arrangements.

Shop - Building walls, bridges, walkways, birdhouses, feeders, signs and displays.

Home Economics - Studying pure water, source of food, nutrition, source of clothing, homes, etc.

Social Studies - The effect of resources on nations; on standards of living; how some of our resources must be protected by law; how we lose some of our freedoms by abusing our natural resources. If available, old aerial photos may show local land use changes.

Vocational Agriculture - Conservation measures, land judging, forest management, fish pond management, value of natural areas, good farming practices, etc.

Ecology - The web of life, the water cycle, all the interlocking relations of organisms with environment, effect of pollution and other man-made problems on environment.

Communications - Study animal and human non-verbal communications, study the dance of the bees, the use of antennas by ants, vocabulary building by identifying living things and objects in the outdoor classroom.

English - A study of Thoreau or other famous nature-oriented authors can be related to live situations in the outdoor classroom. Compositions and similar writing assignments can have themes based on natural resource studies.

The use of an outdoor classroom should not be confined to the school year. It can be used throughout the year by schools, girl scouts, boy scouts, campfire girls, garden clubs, bird watchers, 4-H clubs and similar organizations. A properly planned area will undergo a multitude of seasonal changes. Self-guiding facilities are preferred by those who prefer individual or family activities. Parents can visit the areas with their children and should be encouraged to do so. Most parents enjoy pointing out and explaining things to their children. Self-guiding education areas help them to do this. However, tours may be arranged on appropriate areas.

Yearlong use of an outdoor classroom by families and local groups increases its value to the community.

After the classroom is established, training for proper utilization of the area will be needed. This help can take the form of (1) training sessions for teachers or leaders, (2) demonstration walks through the area, (3) check lists of things to be found in the area, (4) guide leaflets, and (5) suggestions on how to use the area and projects that can be carried out. Once teachers understand the area and what it can accomplish, its effectiveness can be expanded many-fold.

Once the outdoor classroom has been developed it is important that it be periodically inspected. The area must be checked in order to determine if it is maintaining itself to the function for which it was created. Are changes needed? Are additions required? An inspection committee needs to be established. The original planning committee may change its major role to this purpose. Teachers utilizing the classroom should be on the committee. The SCS District Conservationist or other resource agency people should act as advisors. Inspections should be undertaken seasonally during the first two years after establishment. Once or twice a year should be adequate thereafter.

Inspections will undoubtedly result in a recommendation for periodic clean-up of the area. However, clean-up should not be dependent upon the inspection report but should be planned. The area should be cleaned on a regular basis. Time and amount will depend upon use of the area, facilities included and make-up of the area. Students from youth groups or high school students from low-income families can be hired to keep the area in tip-top shape. Resource-oriented students are best. However, a check list is suggested to make sure the job is done.

Anti-litter and anti-desecration of the outdoor classroom needs to be an important part of the conservation education program. This should emphasize the pride of keeping the area clean and neat and the privilege of using the area.

Technically-oriented members of the inspection committee should pay particular attention to the resource aspects of the area.

Plants often need to be replanted. New plant materials may be required and trees pruned or thinned. Participation in this type of maintenance again offers an opportunity for a lesson in practical conservation and ecology.

Facilities also require periodic replacement. Trails, steps, building and benches require attention and replacement.

All of the items mentioned, periodic clean-up, resource management and replacement of facilities, require an annual operating budget. Costs of starting and operating an outdoor classroom vary considerably. These costs must be geared to what the community or the school can afford.

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National Audubon Society
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950 Third Avenue
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